

WHAT IS CLAIMED

1. A filtration unit comprising:

an external enclosure provided with at least one inlet orifice and at least one outlet orifice; and  
5 a porous element enclosed by the external enclosure, the porous element including a deleukocytation medium,

wherein the deleukocytation medium includes at least one layer of a non-woven, porous polyurethane fabric, and

10 wherein the filtration unit is operable to selectively leukodeplete a fluid containing leukocytes and platelets when the fluid flows from upstream to downstream through the filtration unit.

15

2. The filtration unit of Claim 1, wherein the polyurethane fabric has been gas plasma-treated to increase its hydrophilicity.

20

3. The filtration unit of Claim 1, wherein the deleukocytation medium is operable to remove leukocytes to a degree of at least approximately 2 log from the fluid while removing approximately 20% or less of platelets in the fluid when the fluid flows from upstream 25 to downstream.

4. The filtration unit of Claim 1, wherein platelets do not substantially adhere to the polyurethane fabric.

30

5. The filtration unit of Claim 1, wherein the mean diameter of pores in the porous polyurethane fabric is large enough to allow passage of substantially all platelets in the fluid, but small enough to prevent 5 passage of leukocytes in the fluid when the fluid flows from upstream to downstream.

6. The filtration unit of Claim 1, wherein the mean diameter of pores in the porous polyurethane fabric 10 is between approximately 5 and 15  $\mu\text{m}$ .

7. The filtration unit of Claim 1, wherein the deleukocytation medium comprises at least two layers of a non-woven, porous polyurethane fabric.

15

8. The filtration unit of Claim 7, wherein the porosity of the at least two layers of a non-woven, porous polyurethane fabric decreases from upstream to downstream.

20

9. The filtration unit of Claim 1, wherein the deleukocytation medium further comprises at least one porous membrane downstream of the polyurethane fabric.

25

10. The filtration unit of Claim 9, wherein the membrane comprises a material selected from the group consisting of: fluorocarbon polymers, cellulose derivatives, polyurethanes, polysulphones, sulphonated polyethers, polycarbonates, and combinations thereof.

30

11. The filtration unit of Claim 10, wherein the membrane comprises a polyvinylpyrrolidone and polysulphone copolymer.

5 12. The filtration unit of Claim 10, wherein substantially all pores of the porous membrane have a pore diameter of between approximately 2 and 10  $\mu\text{m}$ .

10 13. The filtration unit of Claim 1, wherein the porous element further comprises a prefilter disposed upstream of the deleukocytation medium, the prefilter including at least one layer of non-woven fabric.

15 14. The filtration unit of Claim 1, wherein the porous element further comprises a post-filter disposed downstream of the deleukocytation medium, the post-filter including at least one layer of non-woven fabric.

20 15. The method of Claim 1, wherein the fluid comprises blood or a blood component.

16. A bag system comprising:

a collection bag operable to receive a fluid containing platelets, the collection bag including an outlet orifice;

5 a filtration unit including:

an inlet orifice located upstream of;  
a deleukocytation medium including at least one layer of a non-woven, porous polyurethane fabric;

10 an outlet orifice located downstream of the deleukocytation medium;

a filtrate collection bag;

15 a tube operable to provide fluid communication from the outlet orifice of the collection bag to the inlet orifice of the filtration unit; and

a tube operable to provide fluid communication from the outlet orifice of the filtration unit to the inlet orifice of the filtrate collection bag,

20 wherein the system is operable to selectively leukodeplete the fluid when the fluid flows from upstream to downstream.

17. The bag system of Claim 16, wherein the polyurethane fabric has been gas plasma-treated to increase its hydrophilicity.

25  
30 18. The bag system of Claim 16, wherein the deleukocytation medium is operable to remove leukocytes to a degree of at least approximately 2 log from the fluid while removing approximately 20% or less of platelets in the fluid. when the fluid flows from upstream to downstream.

19. The bag system of Claim 16, wherein the fluid is blood or a blood component.

5       20. The bag system of Claim 16, further comprising:  
          a second collection bag; and  
          a second filtration unit including a  
deleukocytation medium in fluid communication with the  
collection bag and the second collection bag;  
10            wherein at least one component of the fluid may  
flow from the collection bag, through the second  
filtration unit, into the second collection bag.

15       21. The bag system of Claim 16, wherein the fluid comprises blood and at least one component comprises red  
blood cells.

20       22. The bag system of Claim 21, wherein the deleukocytation medium comprises at least one layer of  
non-woven, porous polyurethane fabric.

25       23. The bag system of Claim 22, wherein the mean diameter of pores in the porous polyurethane fabric is large enough to allow passage of substantially all platelets and red blood cells in the fluid, but small enough to prevent passage of leukocytes in the fluid.

24. A fluid filter material comprising gas plasma-treated polyurethane.

25. The filter material of Claim 24, wherein the  
5 gas plasma-treated polyurethane is more hydrophilic than  
untreated polyurethane.

26. The filter material of Claim 24, wherein the  
gas plasma-treated polyurethane is in the form of a non-  
10 woven porous fabric.

27. The filter material of Claim 26, wherein the  
fabric is operable to selectively leukodeplete a fluid  
containing platelets when the fluid flows through the  
15 fabric.

28. The filter material of Claim 27, wherein the  
fabric is operable to remove leukocytes to a degree of at  
least approximately 2 log from the fluid while removing  
20 approximately 20% or less of platelets in the fluid when  
the fluid flows through the fabric.

29. A method of treating a polyurethane filter material comprising exposing the filter material to gas plasma, wherein the hydrophilicity of the filter material is increased.

5

30. The method of Claim 29, wherein exposing the filter material to gas plasma comprises:

10 placing the filter material in a treatment chamber at a pressure of approximately 200-220 millitorr;

providing O<sub>2</sub> to the chamber at a flow rate of approximately 1-2 L/min; and

15 supplying an approximately 13.56 MHz, approximately 1000 Watt radio frequency to the chamber for approximately 30 minutes.

15

31. The method of Claim 29, wherein the polyurethane filter material comprises a non-woven, porous fabric.

32. A method of selective deleukocytation of a fluid containing platelets and leukocytes comprising:

proving a filter including a deleukocytation medium, the deleukocytation medium including at least one layer of non-woven, porous polyurethane fabric;

passing a fluid containing platelets and leukocytes through the filter to produce filtered fluid; and collecting the filtered fluid.

10 33. The method of Claim 32, wherein the polyurethane fabric has been gas plasma-treated to increase its hydrophilicity.

15 34. The method of Claim 32, wherein the deleukocytation medium is operable to remove leukocytes to a degree of at least approximately 2 log from the fluid while removing approximately 20% or less of platelets in the fluid when the fluid passes through the filter.

20 35. The method of Claim 32, wherein the fluid comprises blood or a blood component.